THE VETERINARY RECORD

FOUNDED BY WILLIAM HUNTING, F.R.C.V.S., 1888.

No. 6. FEBRUARY 7, 1942. VOL. 54.

Suggested Technique to be Employed in Pregnancy Diagnosis, and the Treatment of Infertility in the Bovine

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It has been estimated that at least one-third of all the animals which annually leave dairy herds are disposed of on account of infertility. It has been further estimated that about 80 per cent. of this loss due to infertility is preventable. It will, therefore, be appreciated that it is of the utmost importance that those practitioners who have not hitherto concerned themselves with this important branch of veterinary practice should now make themselves fully conversant with the subject.

It must be realised that the bull can be and is occasionally solely responsible for infertility in a herd and where the breeding records show a gradually reduced fertility, steps should be taken to exonerate the bull before widespread treatment of the cows is contemplated.

INFERTILITY IN THE MALE

It is necessary to ascertain :—

(*a*) How many bulls are utilised.

(*b*) Whether the infertility appears to be associated with any particular bull.

(*c*) If cows which previously failed to hold to one bull have held to another bull.

Some of the commoner conditions which may give rise to infertility in the bull are :—

1. Over-use, particularly in the young bull. This can be remedied by complete sexual rest at pasture.

2. Obesity, particularly when associated with lack of exercise. Such animals are usually slow workers and of impaired fertility.

3. Inflammatory and degenerative changes in the testicles and uro-genital tract ; these may be responsible for alteration in the morphology, viability and motility of the spermatozoa.

Where facilities permit, semen for examination should be collected in an artificial vagina. Alternatively, an ejaculate may be obtained by rectal massage of the seminal vesicles and *vas deferens*. A number of bulls, however, fail to respond to such massage and one must then adopt the less satisfactory method of permitting the bull to serve a cow in oestrum and collecting semen from the vagina. Before service, as much as possible of the oestral secretion found in the vagina should be removed by the hand which has been lubricated with liquid paraffin. Failure to remove such secretion renders the semen difficult to handle, interferes with microscopical examination and is liable to lead to an unjustified condemnation of the bull.

The volume of the ejaculate normally varies from 2 to 8 c.c.

Semen may be tested for evidence of number, viability and motility of sperms either in hanging drop preparations or by placing a drop on a slide, covering with a cover-slip and examining microscopically using a one-sixth inch objective.

Even if spermatozoa are individually normal they must be present in sufficient numbers and be actively motile, otherwise the ovum may not be fertilised (the average number of sperms per c.mm. in the bull is 800,000, but within normality this number may vary from 300,000 to 1,200,000). A characteristic 'wave movement' is associated with high fertility in contradistinction to the 'oscillatory movement' of individual spermatozoa in semen from a bull of low fertility.

Changes in morphology commonly seen are bent or broken tails, double heads or double tails, abnormal shape, etc. ; these can be detected in fresh or appropriately stained preparations. Ten per cent. or less of abnormal spermatozoa are of no consequence and can be ignored.

It must be remembered that it is possible for the bull to produce spermatozoa which are healthy and sufficient in number to be considered normal one day and to give the reverse picture the next day ; the history in such cases is of impaired fertility, not of absolute sterility.

A bull should never be condemned as the result of the examination of a single ejaculate since this may be subnormal in quantity, quality or both. Spermatozoa stored in the genital tract rapidly undergo degenerative changes ; therefore in case of doubt a second ejaculate should be collected and examined forthwith.

4. Other conditions interfering with the bull's ability to breed are balanitis (due to coital exanthema or trichomoniasis) and orchitis (often due to *Brucella abortus*) which is frequently associated with thermal atrophy of the other testicle.

INFERTILITY IN THE FEMALE

If one is satisfied that the bull is not solely at fault, the following inquiries should be made :—

(*a*) How many cows are returning to the bull ?

(*b*) Are they returning at the normal periods (18 to 22 days) or at abnormal periods ? Particular inquiry should be made as to whether the cows are returning between 8 to 12 weeks as possible evidence of trichomonas infection.

(*c*) Has there been any abortion in the herd ?

(*d*) Has the herd been blood tested for evidence of *Br. abortus* infection ? If so, when and with what result ?

(*e*) Has any anti-abortion vaccine been used ? If so, what type ?

(*f*) Have the pastures been heavily limed in recent years ? It is believed that where heavy liming has taken place, particularly on park land, a manganese deficiency in the diet may be caused, due to fixation of that particular mineral in the soil, rendering it unavailable to the cow. A manganese deficiency is associated with infertility and can be rectified by the addition of manganese as a supplement to the ration in the form of a 4 per cent. manganese sulphate solution, 1-oz. doses being given daily in the food.

When dealing with an individual cow or heifer, the following inquiries should be made :—

1. What was the date of last calving ?
2. Was it normal ?
3. Was the afterbirth retained ?
4. Did the cow show "whites" after calving ?
5. Has the cow ever aborted ?
6. Has she been blood tested ? If so, what was the result ?
7. Has the cow been vaccinated against abortion ? If so, when and with what vaccine ?
8. Has oestrus been seen ? If so, does she come bulling at regular or irregular periods ?
9. Has she been served since she last calved ? If so, how often ? What was the date of the last service ?
10. Has there been any evidence of discharge from the vulva, particularly after service or oestrus ? If so, what was the character of the discharge ?

The evidence in respect of individual animals given by the farmer or herdsman should not be accepted as infallible but must be confirmed so far as is practicable by clinical examination.

In addition to possible errors on the part of the farmer or herdsman, there are definite well known physiological abnormalities, *e.g.*, a cow, although pregnant, may show symptoms of oestrus frequently regularly, and often up to the time of parturition ; such animals may even accept service, and this may

be followed by abortion. On the other hand, many cows and heifers do not conceive and yet fail to exhibit manifestations of oestrus for prolonged periods.

Before proceeding with the examination of an individual animal it must be adequately restrained. It is recommended that the nose should be held and that a man should be available to stand at the side of the animal drawing the tail forward and keeping the cow in position.

The examination is then carried out as follows :

First look for evidence of discharge on the tail and on the hairs of the lower commissure of the vulva. It is common for cows suffering from cervicitis and endometritis to show no vaginal discharge except a day or two after oestrus or service. Similarly in pyometra, cows may show only a periodic discharge. The discharge is not very obvious in all cases and may be evidenced only by a glairy discharge which dries rapidly and adheres to the underside of the tail and the hairs on the lower commissure of the vulva.

The region of the anus and vulva is then cleansed with a non-irritant antiseptic solution and the vulva and *portio vaginalis* examined ; the lips of the vulva are parted to examine for evidence of vaginitis. Four forms are recognised :—

(*a*) Granular vaginitis which is evidenced by small 'millet seed' elevations on the mucous membrane, particularly in the region of the clitoris. (The bull may show granular lesions on the penis and prepuce accompanied by discharge and swelling.)

(*b*) Vesicular vaginitis—an acute condition frequently accompanied by constitutional symptoms ; the tail is elevated, there is frequent micturition, a copious discharge and the cow hesitates to move her hindquarters. The vulva is swollen and vesicles are present on the vaginal mucous membrane. When this disease is present in a herd, cases are multiple and the onset in the individual is usually associated with recent service by an infected bull. No further vaginal examination should be made until the condition has been successfully treated. (The bull may show similar lesions on the penis, accompanied by discharge and swelling of the prepuce.)

(*c*) Trichomoniasis—a very acute vaginitis is frequently associated with this condition. It may occur within two or three days of the cow or heifer being served by an affected bull or later when discharge is flowing over the vaginal floor. The mucous membrane has a characteristic "raspy" feel and adhesions commonly result.

(*d*) The majority of cases of vaginitis are secondary to infection higher in the genital tract with or without discharge flowing over the vaginal floor. Generally this trouble is secondary to a metritis ; this applies particularly to those cases which fail to respond to local treatment and many of these clear up spontaneously when the primary seat of infection has been treated successfully. In vaginitis of this type, part or the whole of the vaginal mucosa has a roughened texture and a dirty pinkish-yellow appearance. (The bull may show inflammatory lesions on the penis and prepuce accompanied by discharge and swelling.)

Treatment

In vaginitis due to (*a*) and (*b*) treatment is by local application of normal saline solution or of a suitable antiseptic, *e.g.*, a 1 : 1,000 solution of zinc sulpho-carbolate. (The prepuce of the bull can also be irrigated with this antiseptic.)

Vaginitis due to (*c*) and (*d*) may be treated by irrigation with a 1 : 1,000-1 : 500 solution of liquor iodi. (The prepuce and sheath of the bull affected with (*d*) may be irrigated with a 1 : 1,000 solution of pot. permang.)

A manual examination of the vagina is now made. This examination is practically restricted to cows which have had one or more calves, owing to the impossibility of inserting the hand into the vagina of most heifers ; the use of a vaginal speculum and torch will, however, enable an optical examination to be carried out in many heifers.

It is advisable to acquire the habit of using one hand for vaginal and the other for rectal examination ; most people appear to use the right hand for rectal manipulation but there is much to be said for the opposite procedure as, particularly during the spring and summer months, this type of work results in the hand becoming very stained from the faeces and the right hand is more often in evidence than is the left one.

The hand is well washed with a non-irritant soap and antiseptic solution and is inserted into the vagina in the form of a cone. The condition of the vaginal mucosa is noted. A dry adhesive vagina is associated with prolonged anoestrus which may be indicative of pregnancy or of a closed pyometra, etc. Conversely, a moist vagina, which balloons easily, is usually indicative of non-pregnancy but may be found in a pregnant animal suffering from a catarrhal condition of the vagina or cervix, or in a case of impending abortion. Discharge may be present in the region of the cervix ; if present, some of it should be removed and examined. A clear mucilaginous discharge is associated with recent oestrus ; a state of oestrus may be confirmed by rectal examination of the uterus and ovaries. Discharge thought to be abnormal should be collected in a suitable clean container for further examination. Cysts may be present in the wall of the vagina ; if these are associated with infertility, they should be opened and swabbed with a solution of iodine.

The cervix is next examined. The finger tip is applied to the *os uteri externum* with a view to detecting the nature of the seal, if present. An adhesive seal may be indicative of normal pregnancy and may be detected from five weeks after service ; it varies considerably in size, particularly in young animals ; it may simply correspond to the external opening or it may be a comparatively large mass extending over the whole of the cervix. Alternatively, a moist plug may be felt in the cervix, particularly when the cervix is partially patent, as in an impending abortion. Inability to detect a seal must not be taken as conclusive evidence that the animal is not pregnant.

Varying degrees of cervicitis are recognised ; only the *os uteri externum* may be slightly inflamed ; in other cases one or more of the annular bands of the cervical mucosa (normally three in number) may be protruding through the os ; frequently, the cervicitis may be indicated by an enlarged fleshy cervix without annular protrusion.

Cervicitis is usually associated with an endometritis and is treated in conjunction with that condition.

The hand is then withdrawn until the palm is lying just within the vulva. The vulsellum forceps are passed in the palm of the hand into the vagina. A finger or thumb is applied to the *os uteri externum* as if attempting to detect the presence of the seal and used as a guide to enable a firm hold to be taken at the edge of the os by the forceps. In the heifer fixation of the cervix and retraction is unnecessary to permit satisfactory palpation per rectum of the uterus, etc., particularly in the early stages of pregnancy. In the cow retraction of the cervix facilitates the procedure.

A rectal examination is now made. (In order to avoid injury to the rectal mucosa it is essential that the finger nails be pared short.) The hand and arm are washed and lubricated with soap and water or a suitable emollient and passed into the rectum. If faeces are present they should be removed. When peristalsis occurs, attempts to palpate the genital organs should be delayed until the peristaltic wave has passed. If peristalsis persists, or the cow strains repeatedly, the back should be pinched, or the tail elevated, or the clitoris subjected to pressure. In exceptionally persistent cases, epidural anaesthesia may be given but the abnormal 'feel' of the genitalia thus obtained must be borne in mind and examination should be carried out before anaesthesia is complete, as this is accompanied by a persistent ballooning of the rectum which makes palpation almost impossible.

The cervix to which the forceps have been attached is located. This can be facilitated by the movement of the forceps with the other hand to indicate its position. If the uterus is empty, it lies either entirely within the pelvis (this is particularly the case in heifers, when usually the whole uterus can be contained in one hand) or the horns may extend over the pelvic brim. In the latter case, retraction of the cervix greatly facilitates examination. It must be emphasised that only in exceptional cases is it necessary to insert the arm a long way into the rectum to palpate the non-gravid uterus and ovaries ; it is generally unnecessary to insert more than half the forearm.

Having located the cervix, the hand is passed forward to the bifurcation of the horns. (The cervix is normally about 3½ inches long and the bifurcation of the uterus commences about one inch anterior to this.) At the bifurcation there is a small ligament joining the two horns which can be picked up with the forefinger to assist further in retraction and facilitate examination.

The uterine horns are traced throughout their length; their size and consistence is noted and compared. In the healthy non-gravid uterus of the heifer or young cow, the horns are usually convoluted, being directed forward, downward and outward, and backward. In an older animal the horns are elongated, less convoluted and extend forward over the brim of the pelvis.

Next locate the ovaries in turn. They are found close to the apices of the uterine cornua; note their size and condition; carefully examine each to detect the presence of a corpus luteum, Graafian follicle or cyst. The ovaries of both the pregnant and non-pregnant bovine vary in size and shape within comparatively wide limits of normality.

A *corpus luteum* is a solid body frequently comprising the greater part of the ovary.

A ripe *Graafian follicle* is a slight protrusion of the surface of the ovary; it has a definite fluid wave on palpation and, when ripe, ruptures on touch.

Cysts vary in size. They may be minute or assume gigantic proportions; they may be single or multiple and may be associated with a condition of anoestrus or nymphomania; the wall may be thin and easily ruptured or thick and exceedingly tough; in the latter case it may be difficult to detect a fluid wave.

When the operator becomes experienced he should, if the ovaries are palpable, be able to insert two or more fingers into each ovarian bursa and ascertain whether the Fallopian tubes are palpable and also if adhesions exist. When a Fallopian tube can readily be felt or when adhesions can be detected, salpingitis is present; if the condition is bilateral—and it frequently is—sterility is absolute.

In many cows the cause of infertility is easily recognised by clinical examination. The predominating condition responsible is generally agreed to be an endometritis which varies considerably in degree. Very frequently no gross lesions are present in the uterus and endometritis may be suspected only on account of a mild cervicitis or a lack of tone in the uterus; often these two symptoms are found together. In a considerable proportion of cases, the main evidence on which a condition of endometritis is assumed to exist is a history of infertility, with regular oestrus, and the absence of macroscopic or palpable lesions in the genitalia. The high percentage of pregnancies following a single irrigation of the uterus with a suitably dilute solution of iodine is thought to be sufficient justification for the assumption that the condition referred to above is an endometritis of the first degree described by Folmer Nielsen.

By the examination of *post-mortem* specimens an excellent opportunity is afforded to the practitioner of making himself familiar with normal and abnormal conditions met with in the bovine genitalia.

The Diagnosis of Pregnancy

Whilst it is often possible, particularly in heifers, to diagnose a pregnancy of five to six weeks' duration, for practical purposes practitioners should aim at being able to diagnose with certainty a nine weeks' cyesis.

For the purposes of this diagnosis, the following general indications will be of assistance :—

Indications of Non-pregnancy

1. The presence of oestrus—regular or irregular. This alone cannot be accepted as certain evidence that a cow is not pregnant; a number of cows come into oestrus regularly or irregularly although in calf, and it is not uncommon for them to accept service even up to the act of parturition or abortion.

At the time of oestrus and for a day or two afterwards a quantity of clear mucus is present in the vagina and oozes from the vulva.

During oestrus the uterus feels engorged and erectile.

A corpus luteum cannot be detected in the ovary at oestrus.

2. The vagina of the non-pregnant cow feels moist except in those cows in which oestrus has been absent for some time, *e.g.*, in prolonged anoestrus due to physiological conditions where a persistent corpus luteum exists or in a closed pyometra. In these cases the feel of the vagina may somewhat resemble that associated with pregnancy.

The use of a vaginal speculum and an electric torch will enable the moist glistening appearance of the vagina associated with non-pregnancy to be seen in most cows, and in maiden heifers if the speculum can be inserted through the vulva.

3. The absence of the uterine seal. Inability to detect the seal must never be accepted *per se* as definite evidence of non-pregnancy.

4. The cervix and entire uterus can almost invariably be palpated per rectum, except in some cases of pyometra.

5. *The absence of a corpus luteum from each ovary when both are palpable is positive evidence of non-pregnancy.* The converse is not true, since a corpus luteum if present, may be either a corpus luteum of pregnancy or a corpus luteum following oestrus; these are indistinguishable by palpation.

Indications of Pregnancy

1. The absence of oestrus after service—oestrus having previously been normal and regular. This alone can never be accepted as definite evidence of normal pregnancy; it may be associated with a silent heat, with a persistent corpus luteum in the non-gravid cow, with pyometra, with the presence of a mummified foetus or with anoestrus due to physiological causes. Experience shows that many cases are met with in which oestrus is absent or stated to be absent and the cow or heifer is not pregnant.

2. The dry somewhat adhesive feel of the vagina. This is fairly constant, but pregnant cows are met with in which catarrhal conditions of the vagina exist which may be more characteristic of non-pregnancy. This is particularly so in cows which have had pronounced cervicitis or vaginitis as a sequel to the previous pregnancy; also in early trichomonas or *C. pyogenes* infection, or in an impending abortion.

When a catarrhal condition of the vagina, particularly if accompanied by a patent cervix, is found in association with undoubted pregnancy, the practitioner should protect himself by informing the owner that the animal may calve prematurely; if he fails to take this simple precaution he may well find himself held responsible for unfortunate developments.

In addition to normal pregnancy, conditions associated with a prolonged anoestrus, *e.g.*, certain physiological conditions resulting in inactivity of the ovaries, a persistent corpus luteum, a closed pyometra or the presence of a mummified foetus, may each be responsible for a dry adhesive vagina.

The use of a vaginal speculum and an electric torch will enable the dull lustre associated with prolonged anoestrus to be seen in cows and in some heifers.

3. The detection of the uterine seal. This can usually be palpated from five weeks onwards. It fills the cervical canal and is characteristically adhesive to the tip of the finger. Its presence is very strong evidence of normal pregnancy having existed but it is possible for the uterine seal to persist when the foetus has mummified or when a closed pyometra has occurred during pregnancy.

Inability to detect the seal cannot be accepted as definite evidence that the cow is not pregnant. The seal varies considerably in size, in many cases being large enough to render detection very simple; in other cases (particularly in young cows) it may be quite a small adhesive point corresponding to the actual size of the external opening of the os. In some cases it may not be detectable at all.

4. The characteristic enlargement of the pregnant horn, and subsequent further increase in size, together with the presence of the corpus luteum in the corresponding ovary. Palpation of the enlarged uterus of pregnancy reveals a characteristic condition. In single foetus pregnancy, the gravid horn is enlarged compared with the non-gravid. On palpation, one gains the impression that one is feeling a comparatively thin membrane containing freely moving liquid which is not under pressure. Enlargement is not obvious for some weeks but it may be detected, after considerable experience, as early as five weeks when the enlargement takes the form of a bulge, just discernible. The increase in size is gradual but at nine weeks it is unmistakable; from then until 14 weeks the pregnant horn increases rapidly in size but it can still be defined by the hand. As pregnancy advances the uterus falls forward into the abdominal cavity; for this reason it may not be possible to palpate

the enlarged uterus easily after five months, but if the cervix is fixed and retracted, a firm, wide, stretched bandlike structure is felt disappearing over the pelvic brim. The corpus luteum of pregnancy is, of course, present in the ovary but it is not possible to differentiate this from the corpus luteum following oestrus. As pregnancy advances it may be difficult or impossible to palpate the ovary if it has been carried forward by the weight of the pregnant uterus.

5. Palpation of the foetus per rectum. This is first possible at about 9 weeks, when it approximates the size of a ping-pong ball. At from 12 to 14 weeks it gives the impression of a tennis ball bouncing gently against the hand. At 4 months the foetus, by this time about the size of a rat, can often be manipulated. At 5 months it is about the size of a rabbit, then, and later when palpable, its age may be determined by the size of the skull or of a limb. Between 5½ and 7 months palpation is usually difficult or impossible due to the presence of copious uterine fluids and the tendency of the uterus to fall forward into the abdominal cavity, but palpation is facilitated by the use of vulsellum forceps attached to the cervix. (Not infrequently a normal 6 months foetus, about the size of a terrier, is found well up in the pelvis and easily palpable in young animals.) At 7 months it is about the size of an Irish terrier or small retriever, and from this time onwards the foetus can normally be felt, usually with ease.

6. The enlargement and characteristic 'thrill' or fremitus of the middle uterine artery supplying the pregnant horn. At 12 weeks gestation this artery is about the calibre of a slate pencil and is fairly easily recognised; it then usually lies immediately in front of the brim of the pelvis at the lateral margin formed by the edges of the ilium. The 'vibration' or 'thrill' which is first detected at this period and which persists until the end of pregnancy, is of value in differential diagnosis. The artery becomes readily palpable within the pelvis and is freely moveable; it increases in size until it is as thick as a middle finger and the fremitus becomes more and more distinct.

7 The presence of cotyledons. In a gravid uterus these can first be palpated at about 16 weeks; at this period, if the fingers are drawn across the surface of the uterus, the cotyledons feel like corks floating on water. They increase in size as pregnancy advances.

[*In pyometra* due to any cause, palpation of the uterus conveys an entirely different impression from that of pregnancy. Generally speaking, in pyometra there is less fluctuation in the uterine horn than would be found in a comparable enlargement due to pregnancy and the swelling is more uniform. In addition, in pyometra the uterine wall is thickened. A tense bilateral swelling of the uterine horns is almost diagnostic of pyometra, particularly when only one corpus luteum is present. Cotyledons cannot be palpated. The uterine arteries, although they may be enlarged, and a pulse easily discernible, lack the characteristic 'thrill' associated with pregnancy.]

It will now be appreciated that in order to reach a decision as to whether or not an animal is pregnant and, if pregnant, the stage of cyesis, the pros and cons of a number of impressions must be taken into consideration. In determining the existence of pregnancy, it must be remembered that the only definite evidence of non-pregnancy is the absence of a corpus luteum from each ovary when both are palpable. In assessing the stage of pregnancy, the practitioner may be guided by, for example, the size of the middle uterine artery, if palpable, and the quality of the fremitus; the size of the uterus in so far as he is able to determine it; the absence of, or the presence and size of, the cotyledons; the size of the foetus or part of it, if palpable. The recognition of fremitus in the middle uterine artery is diagnostic of pregnancy in the horn which it supplies. A fairly accurate opinion as to the stage of pregnancy may be determined alone by the size of the artery and the quality of the fremitus. Fremitus in the middle uterine artery on both sides is believed to be diagnostic of a pregnancy in each horn. It is, therefore, not essential to palpate the foetus to make an accurate diagnosis of pregnancy; prolonged examination in an effort to do this is, in consequence, unnecessary. With practice an accurate diagnosis can be made quickly and the examination should be as rapid as is compatible with accuracy.

Warning

It must be emphasised that if any doubt exists as to the presence or absence of pregnancy, no treatment of any description must be undertaken pending re-examination and definite diagnosis in 10 days to 3 weeks. The expression of a corpus luteum of pregnancy will almost certainly result in the expulsion of the foetus and the passage of a uterine catheter in a pregnant cow may induce abortion in a day or two. It must further be reiterated that, for the reasons previously stated, the history given by attendants cannot be accepted as definite evidence of the presence or absence of pregnancy. The careful examination for pregnancy of every cow submitted for treatment for infertility is essential before the application of that treatment.

The Treatment of Infertility in the Bovine

The Technique of Intra-uterine Injection

For the purpose of this description it is assumed that the left hand is being used in the vagina and the right hand in the rectum.

With the vulsellum forceps in position, the left hand is withdrawn until the palm is just within the vulva. The end of the uterine catheter is passed into the palm of the hand and directed towards the cervix; the *os uteri externum* is located with the tip of the left thumb or forefinger and the catheter guided into it. By a slow turning movement of the right hand when obstruction is met, the catheter is gradually guided through the canal, the passage being facilitated by the curve in the catheter. Guidance through the canal is assisted by the left hand grasping the cervix in the vagina and attempting to ascertain the location of the obstruction when it is met with and obtaining some indication as to the way the catheter should be directed to overcome that obstruction. When an obstruction is met, the catheter should be slightly withdrawn and a turning movement made directing the catheter away from the obstruction. When the end of the catheter passes through the canal the left hand is withdrawn from the vagina and grasps the catheter and forceps outside the vulva. The right hand, previously lubricated, is passed into the rectum and the end of the catheter may be directed into each horn in turn.

If passage by the above method proves impossible, hold the catheter in the os, fixing it in position by holding it and the forceps in the left hand outside the vulva, pass the right hand into the rectum, locate and grasp the cervix. With a slow rotary movement of *both* hands it is usually possible to insinuate the catheter through the cervical canal.

In heifers it is seldom possible to insert the hand into the vagina, in which case the most satisfactory means of passing the catheter is as follows:—a cylindrical speculum (not more than 1 foot long) is inserted into the vagina and aided by the light of an electric torch, the speculum is pressed against the fornix of the vagina so that the cervix is fixed by the rim of the speculum. The tip of a specially fine bore heifer catheter is then applied to the *os uteri externum* and gently rotated through the cervical canal. If difficulty is experienced, the os can be fixed by the use of vulsellum forceps applied through the speculum and the catheter guided through the cervix by grasping the latter with the right hand per rectum.

If no vaginal speculum is available the catheter is passed forward to the anterior end of the vagina; with the right hand grasping the cervix per rectum, the catheter is inserted into the *os uteri externum* and, with a slow rotary movement of both hands, is insinuated through the cervix.

Occasionally, both in cows and heifers, it may be possible to pass the catheter only at oestrus or under the influence of epidural anaesthesia, when the cervix is relaxed. It must, however, be remembered that under such conditions the tone of the uterus is not normal and a false impression may be obtained, particularly in the latter case. As previously mentioned, complete anaesthesia is accompanied by ballooning of the rectum which renders manipulation difficult or impossible; therefore, in order to facilitate the passage of the catheter, this latter operation should be carried out as soon as possible after injection.

In passing the catheter there is always the risk of perforating the uterus, but this should be immediately discovered by the hand per rectum. No untoward effect results from the accident if the catheter be withdrawn immediately and passed into the uterus before injecting the solution.

Normally between 5 and 6 ounces of an aqueous solution of iodine 1 : 2,000 to 1 : 1,000 is injected into each horn and the

remainder of 12 ounces is injected into the vagina as the catheter is withdrawn from the cervix. In heifers about half this amount will usually suffice. On all occasions the operator must use his own discretion as to the amount injected but on no account should the horns be fully distended, as in addition to other unfortunate sequelae, salpingitis may result. A convenient method of preparation is to have a stock solution of 5 per cent. liquor iodi (*i.e.*, iodine, 1 oz.; potassium iodide, 2 ozs.; water, 20 ozs.) in a 2- or 4-oz. bottle, graduated in drachms; 2 to 4 drachms of this solution is poured into a 12-oz. bottle which is then filled with clean cold water, giving a final iodine concentration of 1 : 2,000 to 1 : 1,000.

The inexperienced will derive great benefit from the practice of passing the catheter on *post-mortem* specimens of uteri secured to a table or bench of a height comparable to that of a normal cow. Having successfully passed the catheter in this way a number of times with the eyes open, the operation should be repeated with the eyes closed.

The Expression of the Corpus Luteum.

The corpus luteum is most easily palpated 8 to 14 days after oestrus. The method of dislodgement is to squeeze the ovary between the thumb and second joint of the forefinger. After expression of the corpus luteum a deep crater is left in the ovary which can be detected with the finger tip. If completely dislodged, visible oestrus usually occurs in 2 to 5 days. Psychological and physiological manifestations appear to be more intense than usual, particularly in those cases in which oestrus has been 'silent' previously. If the corpus luteum is not completely separated from the ovary, or if a portion of the corpus luteum remains embedded in the ovary, rapid return to oestrus may not follow, the corpus luteum continuing to influence the oestral cycle: even in this latter case, however, normal oestrus will follow in due course.

Care must be taken not to crush the ovary by pressure, otherwise nymphomania may result, which is frequently not amenable to treatment. This crushing is likely to be inflicted if pressure is applied within six days of oestrus before the corpus luteum is 'organised' or when a persistent corpus luteum is difficult to extrude.

In all cases of pyometra the uterus should be injected with a solution of liquor iodi 1 : 1,000-1 : 500, and if a corpus luteum can be palpated in the ovary it should, if possible, be expressed. If not palpable or if palpable but difficult or impossible to extrude, 10 to 20 mgm. stilboestrol dipropionate should be given intramuscularly to promote oestrus-like reaction in the uterus.

When ovarian cysts are encountered and treatment is undertaken, they should be ruptured by firm pressure applied in the same way; the animal should be re-examined at intervals of 7 to 10 days and if a further cyst or cysts have developed these should be dealt with in a similar manner. If none is present and nymphomaniacal symptoms have abated, treatment may result in re-establishment of the normal oestral cycle. This rupturing of cysts may be carried out in conjunction with uterine injection. The animal should not be served until a normal oestral period or periods have been observed.

Appliances necessary for carrying out the technique of pregnancy diagnosis and the treatment of infertility

The practitioner should provide himself with the following:—

Mackintosh overall.
Gum boots.
Vulsellum forceps } Nielsen's pattern.
Single-flow catheter }
Vaginal speculum.
Electric torch.
2- or 4-oz. bottle, graduated in drachms.
12-oz. bottle.
Supply of 5 per cent. solution of liq. iodi (iodine, 1 oz.; potassium iodide, 2 ozs.; water, 20 ozs.).
Enema syringe or glass syringe or container capable of holding 12 ozs.
Pair of barnacles or bulldogs.
Suitable emollient, *e.g.*, Sapolav.
Suitable antiseptic, *e.g.*, Dettol.

On the farm the practitioner should have available two buckets of warm water into each of which he will place an antiseptic. One bucket will be used for his instruments and the other for rinsing his hands and arms. (Where possible, after examination per rectum, it is suggested that the hand and arm should be first swilled under a tap. Where this is not convenient, the preliminary cleansing may be done by swilling the hand and arm *outside* the bucket, the contents of which must be frequently changed).

If a tap is not available a third bucket or a jug of clean cold water is necessary for filling the 12-oz. bottle. The source of the water supply should be ascertained as it is essential that it be free from contamination.

The Oestral Cycle and the Hormones Controlling it

Oestral Cycle

At oestrus a ripe Graafian follicle is present in one or other ovary and can be detected as a slight protrusion from the surface. Under the influence of the follicle-stimulating hormone produced in the follicle itself the well-known psychological symptoms of oestrus become manifest. These are accompanied by hyperaemia of the genitalia and proliferative changes in the endometrium resulting in general enlargement, increased motility and voidance of normal oestral discharge from the vagina.

In 24 to 48 hours ovulation occurs; the follicle ruptures and the ovum finds its way to the pavilion of the ovary and the Fallopian tube where it may be fertilised. The ovum makes its way *via* the Fallopian tube to the uterus.

Up to 6 days it is difficult to detect the corpus luteum which is formed in the follicular cavity by the deposition of lutein tissue produced by proliferation of the cells lining the cavity of the follicle under the influence of luteinising hormone. Form 8 days onwards the corpus luteum can be palpated—from 10 to 12 days *with ease*; it is the major part of the ovary at that time. Regression commences about the 12th day and gradually continues. About the 16th to 18th day it is difficult or impossible to detect, and oestrus recurs about the 21st day, when a ripe Graafian follicle again becomes detectable in the ovary.

Hormones Controlling the Oestral Cycle.

The Anterior Pituitary body elaborates a number of hormones including the two gonadotrophic hormones:—

(1) Follicle stimulating hormone (F.S.H.), the function of which is to stimulate the growth of the Graafian follicles.

(2) Luteinising hormone (L.H.), the function of which is to cause rupture of the ripe follicle and growth of the corpus luteum.

Through these two hormones the anterior pituitary dominates the functional activity of the ovaries. Nothing is known of their chemical nature.

The Posterior Pituitary produces, among other hormones, the oxytocic principle which has a specific effect in causing contraction of the uterus.

The Ovary produces:—

(1) *Oestrogenic hormone* or *oestrone* which is produced by the Graafian follicle and is known as *oestradiol*. It brings about proliferative changes in the endometrium which are accompanied by hyperaemia and increased motility of the uterus. In short, its action is to provoke oestrus. It also brings about duct proliferation in the mammary tissues. There are a number of synthetic oestrogenic hormones.

(2) *Progesterone* which is produced by the corpus luteum. It is responsible for the secretory and decidual changes in the endometrium (changes necessary for successful implantation of the ovum following conception), for the inhibition of uterine motility and for the maintenance of pregnancy. It also brings about lobular development in the mammary tissues.

The Foetal Membranes produce placental progesterone, more particularly at the placental attachment, from about the third month of pregnancy to augment that produced by the corpus luteum.

. . . . .

Among publications which can be consulted in connection with the above are the following:—

Gould, G. N. (1937.) Trichomonas Disease of Cattle (Description of Outbreak). *Vet. Rec.*, **49**, 247-253.

———. (1939.) Trichomonas Infection in the Dairy Herd. *Vet. Rec.*, **51**, 1463-1466.

———. (1941.) Control and Treatment of Infertility in Bovines. *Ibid.*, **53**, 505-507.

THE VETERINARY RECORD

February 7th, 1942.

DIAGNOSIS OF PREGNANCY AND INFERTILITY

IN earlier days the average veterinarian was seldom called upon to make routine examinations of the mares in a breeding stud or of the cows in a dairy herd, and indicate which were and which were not pregnant. He might be called upon to examine individual animals, but it mattered little whether he was able to give an immediate diagnosis or preferred to play for caution and delay his opinion until he re-examined a month or more later. The importance of this diagnosis was purely local: it might be the owner's curiosity (or impatience) or it might be the desire to have a check upon the efficacy of his treatment of a barren brood mare or cow, that impelled the examination.

During more recent years, however, among horse breeders and breeders of beef and dairy cattle, there has arisen a demand for stud or herd routine pregnancy diagnosis, especially by the more enlightened and up-to-date owners. Various practitioners have taken the trouble to equip themselves with knowledge of the necessary technique and have given the service required. Gradually the majority of farmers who breed the larger species of farm livestock, noting the advantages obtained by the enlightened few, will increase the demand and are, in fact, already expecting the profession to undertake this work for them.

The work of the Survey Committee has drawn attention to the fundamental importance of the ability to diagnose pregnancy in the control of infertility in dairy cows. The enhanced value of dairy cows has emphasised this importance, and already owners in various parts of the country are showing some degree of impatience at the delay in launching the Survey Committee's Scheme. It has become evident that there are practitioners who feel themselves ill-equipped to undertake pregnancy diagnosis in mares and cows during the earlier stages of gestation. To meet this deficiency a scheme of refresher tuition has been organised by the N.V.M.A. with the financial assistance of the Ministry of Agriculture and, as most readers are aware, has been in operation for some weeks past. In addition, a number of short-term whole-time appointments have been made to investigate infertility, principally in cattle.

Valuable as these schemes are, there can be no doubt that the profession cannot look with equanimity upon an indefinite continuance of individual refresher tuition for any or all of those practitioners who, from time to time, may desire it. Assuming—as we surely can—that there will be a need in future for all practitioners to be able to diagnose pregnancy in both mare and cow at an early date, it becomes necessary to consider how the requisite knowledge and experience can be obtained. The material available at any one college, under present conditions, is limited, while adequate instruction in individual pregnancy diagnosis to a large class is a time-consuming business throwing extra burdens upon an already laden syllabus and inadequate staff. Familiarity with the changes in the reproductive organs throughout the whole period of gestation is essential. It seems obvious, in consequence, that either far greater facilities will be needed by the colleges, such as the possession of farms and one or more veterinary practices, or else that the colleges will be able to provide only the framework of the instruction, and the student will have to pick up his own experience where and how he can. Some practitioners, with the appropriate type of practice, can aid the student or recent graduate to acquire this experience, but at best this type of training will be irregular; opportunity does not come equally to every man.

The informative articles concerned with pregnancy diagnosis and infertility in bovines published in this issue and those which will appear in our next, are commended to our readers.

Hammond, J. (1939.) Physiological Aspects of Bovine Sterility. N.V.M.A. Congr. Gt. Yarmouth. *Vet. Rec.* **51**. 1137-1142.

Hignett, S. L. (1940.) Bovine Sterility. *Vet. Rec.*, **52**, 361-368.

———. (1940.) Technique of Collection of Semen and Artificial Insemination in Bovines. *Ibid.*, **52**, 571-575.

———. (1941.) Some Aspects of Bovine Sterility. *Ibid.*, **53**, 21-25.

Nielsen, Folmer. (1926.) Researches Concerning the Aetiology and Pathogenesis of Sterility in Dairy Cows. N.V.M.A. (Dublin Congress) Handbook, 199-287.

Stableforth, A. W., & Scorgie, A. J. (1937.) Trichomonas Disease of Cattle. *Vet. Rec.*, **49**, 211-224; 253-255.

Steele-Bodger, H. W. (1925.) Notes on a Trip to Denmark and Sweden with Special Reference to Contagious Abortion and Sterility. *Vet. Rec.*, **5** (N.S.) 1125-1132.

CLINICAL COMMUNICATION

Sterility in Cattle Due to Bursitis and Salpingitis

L. E. A. ROWSON, M.R.C.V.S.,

Uttoxeter

A great deal of literature has appeared recently on the subject of sterility and its various causes but one aspect of the condition has not been greatly stressed, this being the recognition of the permanently sterile cow and her elimination from the herd when she ceases to be of economic value. The question of eliminating such an animal throws a great responsibility on the veterinary surgeon and he may not be prepared to undertake this responsibility, but would prefer to give the animal a further trial before passing an opinion. To detect such an animal is of value to the owner in that he can have her in fat condition by the time she ceases to be profitable from a milk point of view and thus dispose of her without wasting time, foodstuffs and labour in a futile attempt to get her in calf. The type of case frequently met with is that the animal in question has been served repeatedly over a period of perhaps nine months, but as she is still milking well the owner is prepared to keep her if she can be got in calf immediately.

In deciding whether or not such an animal is worth treating, a rectal examination of the reproductive organs is carried out, together with a visual examination of the vagina and cervix. The practice of most veterinary surgeons is to examine *per rectum* the ovaries, uterine horns and cervix and base an opinion on these alone. Very few practitioners carry out a routine examination of the ovarian bursae, yet it is known that severe adhesions in this bursa, if bilateral, will cause permanent sterility.

It may be argued that the percentage of such cases is so low that one is unlikely to come across the condition except on rare occasions.

With a view to determining the occurrence of bursal adhesions an examination of a large number of uteri from slaughtered animals was carried out. The animals were of all ages and breed, but maiden heifers were not included since such animals have had little chance of developing the condition. It should be remembered that the group of animals examined were not purely barrens but were cattle sent in for slaughter in the usual routine manner and that, therefore, the percentage of barren cows with adhesions is probably even higher. Against this, however, is the fact that the

Fig. I.

Uterus of Cow showing Adhesions and Salpingitis.

A.—Ovary containing two cysts.

B.—Greatly enlarged and distended Fallopian tube.

C.—Adhesions passing between ovary and tip of uterine horn.

D.—Adhesions passing across both horns of the uterus.

Fig. II.

Showing three fingers inserted into Bursal Pouch of a Normal Animal.

A.—Normal Fallopian tube.

B.—Left horn of uterus.

C.—Pad of fat always found at the base of the pouch.

Fig. III.

View of Bursal Pouch from above.

A—Ovary showing old corpora lutea. B.—Pad of fat at base of pouch. C.—Left horn of uterus.

examination took place during the months of September to December, during which period the culling of barren cattle would be taking place. A total of 296 cattle was examined and revealed bursal adhesions of varying degree in 40 cases.

Number of uteri examined	296
Number with adhesions	40
Percentage with adhesions	13·3
Number of animals pregnant	69
Percentage pregnant	23·3

Site of Lesion.	*Total Adhesions.*	*Slight.*	*Severe.*
Right bursa ...	14	12	2
Left bursa ...	8	8	0
Both bursae ...	18	5	13

It will be seen from the above table that in most cases of bilateral bursitis the condition is severe and the word severe is used only when it is considered that the lesions are sufficient to cause permanent sterility.

Out of 296 cattle examined 13 can, therefore, be considered definitely sterile, 5 probably so and a further 22 possibly difficult to get in calf due to unilateral adhesions.

The adhesions found were of three types:—

(1) Ordinary connective tissue bands involving the Fallopian tube and bursa with strands often passing to the ovary and sometimes right across to the uterine horns, the whole area often being one indistinguishable mass.

(2) Adhesions in which the Fallopian tubes become greatly enlarged and distended (Hydrosalpinx) as shown in Fig. I. In this type adhesions were not so severe but the ovary often contained one or more cysts and the Fallopian tubes were distended with a colourless fluid.

(3) Adhesions due to tuberculous peritonitis. These were somewhat similar to type (1) but they had a red inflamed appearance and the general surface of the uterus was also affected in all cases.

It is interesting to note that in four cases of slight unilateral adhesions the animals were in calf on the side in which adhesions were present. A large corpus luteum was present in each case in the ovary of that side, indicating that the ovum must have passed through the Fallopian tubes in spite of adhesions being present. In all three cases, however, the condition was very slight and the Fallopian tubes only involved for a short distance, but it does indicate that the severity of the adhesions is the governing factor and the decision as to whether the condition is severe enough to cause permanent sterility rests with the veterinary surgeon's ability to detect the presence and severity of these adhesions. To make this decision it is necessary to be experienced in the rectal examination of the ovarian bursae. This is not always a simple matter and for successful examination the rectum must be in a completely relaxed condition.

The technique varies slightly on each side and according to which hand the operator prefers to use. Most people prefer to use the right hand and this is inserted into the rectum in the usual way. If there are any faeces present these should be removed before the operation is commenced and the rectum allowed to relax. The left ovary is then grasped and held between the third finger and thumb. The first two fingers are directed in a downward and forward direction and then turned outwards and upwards and this operation may have to be repeated several times before the fingers pass into the pouch, but once in, the ovary can be released and the third finger inserted along with the other two (see Fig. 2). The thumb is then applied to the outer surface of the bursa and by rolling the fingers and thumb gently together a short length of the Fallopian tube can just be felt in the normal animal. This tube passes in a curve across the upper side of the pouch about two inches from the edge at its centre and approximating it at the uterine and ovarian ends (Fig. 2). If adhesions are present the pouch may be partially or totally occluded depending on their severity, or if very slight they may be felt breaking down as the fingers are inserted. If severe it will be impossible to introduce the fingers at all and a thickening of the area will be felt, while in other cases the adhesions may extend to and involve the uterine horns as well.

To examine the right bursa the right ovary is picked up as before, the first two fingers being directed downwards and forwards and turned outwards and upwards, as in the case of the left side, but it is usually necessary to bend down slightly when examining the right side in order to get sufficient rotation of the arm to direct the fingers outwards and upwards into the pouch.

The cause of bursal adhesions is generally attributed to direct spread of infection along the Fallopian tubes following endometritis but as the condition is sometimes met in maiden heifers this is probably not always the case.

An attempt to test the patency of the Fallopian tubes by the method used in human surgery proved too dangerous to be of value. Experiments were carried out on excised uteri and on dead animals. If air is pumped into a uterus a level is reached above which the pressure is sufficient to force it along the Fallopian tubes and hence into the abdomen. If the pressure is noted on a manometer it will be found always to return to approximately the same threshold level as the air escapes. The apparatus used consisted of a catheter connected to a Y tube, the other two arms of the Y being connected to an ordinary rubber milk fever pump on the one hand and to a manometer on the other. In the case of the excised uteri the catheter was passed in the usual way and a strong rubber ring worked over the cervix to help to make an effective seal. The uterus was then immersed in water and inflated. When a certain pressure was reached bubbles appeared at the ovarian end of the Fallopian tubes, indicating that air was passing through. In about 25 per cent. of cases, however, rupture of the uterus occurred before bubbles appeared.

The rupture always occurred along the attached border or lesser curvature of the uterus.

This point is important, for only recently a case occurred in which a practitioner irrigated a cow with Lugol's solution and the animal died a day or so later. On *post-mortem* examination he could find no rupture of the uterus although there were signs of a severe inflammation. It is highly probable that this was, in fact, a true case of rupture but that the break had occurred (as is usual) at the lesser curvature, the fluid escaping into the connective tissue below, as occurs in the case of inflation with air, with the uterus to all outward appearances being normal.

Palpation of the uterus when air was passing through the Fallopian tubes gave one the impression that the tension produced was very little greater than that obtained when the uterus contracts during lavage with Lugol's solution; it therefore seems possible that some of the fluid may be forced along the Fallopian tubes and into the abdomen during normal irrigations.

If this is so, the importance of using a limited volume of fluid of not too great a strength is obvious since strong solutions passing into the peritoneal cavity in this way may themselves set up adhesions.

Summary

1. An examination of uteri from 296 cattle was carried out.
2. Adhesions of varying degree were found in the ovarian bursa in 40 cases.
3. Thirteen of these 40 cases were bilateral and very severe, reproduction being impossible.
4. Attempts to test the patency of the Fallopian tubes proved too dangerous to be of value.

Weekly Wisdom

One of the commonest characteristics of a newly-discovered fact is that it appears, at first sight, to be unintelligible. Consequently, every advance of this kind serves to bring into prominence the difference between the pure "empiricist" (the man who would put facts before reason) and the pure "rationalist" (the man who would put reason before facts). The former is willing to accept the new fact simply because it seems to be a fact: the latter would prefer to withhold recognition until the alleged discovery has proved itself to be reasonable. In the early days of research, new facts were both plentiful and marvellous; and the cumulative effect of all the little hesitations on the part of the reason-worshippers was, sometimes, considerable. But, always, they caught up again; for the empiricist's structure of facts proved, invariably, in a little while, to be entirely reasonable.—J. W. Dunne: "The Serial Universe."

ABSTRACTS

[TRICHOMONADS IN THE HEART BLOOD OF AN ABORTED FOETUS Madsen, D. E. (1941.) *Cornell Vet.* **31.** 18-20.]

The author records that flagellates, morphologically indistinguishable from *Trichomonas foetus*, were observed by microscopic examination to be present in the mucus of the mouth, stomach contents, heart blood and lungs of an aborted four-months foetus. This examination was not carried out until approximately twelve hours after the foetus had been expelled. No trichomonads could be found in the uterine fluid when this was examined a few hours after the abortion.

This was the sixth calf of the cow in question. Prior to the service of the fourth gestation (normal calving), *T. foetus* was present in large numbers in the vaginal mucus. The fifth pregnancy was also normal and cultural examinations during the gestation period showed no trichomonads. In view of these findings the author briefly discusses the possibility of the blood stream acting as a reservoir for the infective agent, which might explain the irregularity with which the organism can be demonstrated in the genital secretions of infected animals. N. J. S.

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[SO-CALLED INFECTIOUS FELINE ENTERITIS OR PANLEUCOPENIA. Arlein, M. S. (1940.) *N. Amer. Vet.* **21.** 733-737.]

Investigators in America describe a highly contagious, specific virus disease of cats which would appear to be identical with infectious feline enteritis. A constant feature of this condition is a considerable decrease in the numbers of white blood cells. This leucopenia is not merely incidental to the condition but is the direct result of a primary disease of the haematopoietic organs caused by the virus. At the height of infection the average white blood count is about 2,000 per c.mm. compared with the normal figure of 15,000 per c.mm. Differential blood counts indicate that the numbers of all types of leucocytes are reduced. The other symptoms need no description.

It is reported that intranuclear inclusion bodies have been found in certain cells of lymph nodes, bone marrow, spleen and intestinal mucosa. The most extensive pathological change takes place in the bone marrow; this is considered to be the principal focus of infection.

Recovery from one attack of the disease confers a permanent immunity; older cats may have acquired a natural immunity by exposure. Serum from recovered cats confers a passive immunity on susceptible kittens and it is suggested that this serum may be used as a prophylactic agent to protect cats while in hospital for short periods. In the author's hospital limited quantities of serum have been prepared from adult cats which were exposed to infection in a panleucopenia isolation ward for a period of at least two weeks. A satisfactory prophylactic dose of this serum for young kittens is 2·5 c.c. The serum is of no value as a therapeutic agent. W. M. H.

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[ANIMAL SEX CONTROL. Smock, S. C. (1941.) *Vet.' Bull.*, suppl. *Army Med. Bull., U.S. Army.* **35.** 205–209.]

This article is a brief review of recently published literature on the predetermination of the sex of offspring. Prompted by a German report, *The New York Daily News* sponsored a series of experiments in which female rats and rabbits were douched before mating with 2 to 3 per cent. lactic acid or 2 to 3 per cent. sodium bicarbonate, to produce female or male litters respectively. The results were published in detail in a book entitled "Animal Sex Control" by Warren (reviewed in *The Veterinary Bulletin*, October, 1941). The sex majorities were predetermined in 167 out of 175 litters. Subsequently, further favourable results were published by the newspaper. In one series of experiments, using rats, douching with lactic acid gave a sex ratio, male to female, of 55 to 100 (3 per cent. solution, 69 litters) and 68 to 100 (2 per cent. solution, 32 litters); while douching with sodium bicarbonate, the ratio was 124 to 100 (3 per cent. solution, 35 litters) and 206 to 100 (5 per cent. solution, 70 litters). Other workers have failed to confirm these results. J. B. B.

At a recent meeting of the Council of the National Farmers' Union, Mr. C. Nevile, Whisby Hall, Lincoln, was elected president, Mr. T. Peacock (after three years in the chair) having intimated his desire to withdraw his name from the nominations.

IN PARLIAMENT

The following are among the questions and answers recently recorded in the House of Commons:—

Veterinary Diseases

Mr. Mathers asked the Minister of Agriculture how Scottish opinion and experience are obtained in respect of veterinary diseases; and what connection is maintained with the Scottish Department of Agriculture with regard to research?

Mr. Hudson: As the answer is somewhat long I will, with the hon. Member's permission, circulate it in the Official Report.

Mr. Mathers: Will the Minister say whether this matter is proceeding satisfactorily, and whether he is satisfied that an English Minister can possibly do adequate justice to a Scottish problem?

Mr. Hudson: Oh, yes, I have no doubt at all about that.

Following is the answer:

The organisation of all matters connected with animal disease is uniform throughout Great Britain. Scottish opinion and experience is available through channels corresponding to those in England and Wales. In addition one of the Ministry's Superintending Veterinary Inspectors is stationed in Edinburgh for liaison duties. With regard to the second part of the Question, co-ordination of research in England and Scotland is secured through the Agricultural Research Council, which considers and advises on programmes of research in both countries. In addition direct contact is maintained between the officers of the two Departments of Agriculture concerned with research.

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Colonial Development Welfare Schemes

Replying to Mr. Creech Jones, Mr. George Hall (Under-Secretary of State for the Colonies) said: Applications for assistance under the Colonial Development and Welfare Act are made to the Secretary of State either by the Comptroller for Development and Welfare in the West Indies or by the Colonial Governments concerned. The number of applications which have been received from the West Indies is 101; from East Africa 20; West Africa 16, and from the rest of the Empire 43—making a total of 180. Apart from the general encouragement given in the circular despatch of June 5th, 1941, which has been published in Command 6299, it has always been open to Colonial Governments to submit applications for assistance to enable them to carry out schemes of real urgency and importance, and the Governments of certain Colonies (in particular the West Indies) which were in a position to proceed with schemes of development without detriment to the war effort, have been encouraged to do so. It will, however, be appreciated that, under war conditions, it is not easy for Colonial Governments to prepare either general programmes of development or even detailed plans for specific schemes.

Applications received from the Colonies are examined in the Colonial Office as part of the normal business of the Department and are then submitted to the Colonial Development and Welfare Advisory Committee with any explanations or further information which may be needed to assist the Committee. This preliminary examination greatly facilitates the work of the Committee, and my Noble Friend is satisfied that the Chairman is able to give proper attention and adequate consideration to the applications. The Committee is a useful piece of machinery for ensuring that sound principles are applied when considering applications received from different Colonies, and it is proposed that applications should continue to be referred to the Committee.

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Kitchen Waste Collection

Sir Percy Hurd asked the Parliamentary Secretary to the Ministry of Supply whether the tonnage of kitchen waste collected by local authorities for feeding pigs and poultry has increased since the Waste Food Board was set up; and to what extent?

Mr. Harold Macmillan: The Waste Food Board was set up in May, 1941, and in that month local authorities' collections of kitchen waste totalled 12,838 tons, which compared with 11,279 tons in March, 1941, and 11,370 tons in April, 1941. Since May, the tonnage of collections has steadily increased and in December, 1941, reached a new peak figure of 22,000 tons.

NOTES AND NEWS

The Editor will be glad to receive items of professional interest for inclusion in these columns.

Diary of Events

Feb. 18th.—Meeting of the Comparative Section of the Royal Society of Medicine, at 1, Wimpole Street, W.1, 2.15 p.m. for 2.30 p.m.

Feb. 17th.—Adjourned Meeting of Council, N.V.M.A., at the Connaught Rooms, Great Queen Street, Kingsway, W.C.2, 11.30 a.m., to be followed by an Ordinary Meeting of Council.

Feb. 25th.—Annual General Meeting of the Lancashire Division, N.V.M.A., at Manchester, 2.15 p.m.

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R.C.V.S. OBITUARY

Hiles, Herbert Bickerton, The Butts and 38, Britannia Square, Worcester. Graduated London, July 16th, 1902. Died January 29th, 1942; aged 61 years.

Mr. H. B. Hiles, M.R.C.V.S.

We record above with deep regret the death of Mr. Herbert B. Hiles, who had been in practice as a veterinary surgeon in Worcester for over 30 years, and was a familiar and much respected figure in Worcester and the countryside.

Following graduation, after a short period at Ashchurch, Mr. Hiles went to Worcester in 1903, and entered into partnership with the late Mr. W. S. Carless, who had a large practice. In 1906 Mr. Hiles went to Tewkesbury, where he was also well known, and carried on practice until 1911, when he returned to Worcester to join Mr. Carless again. During the war Mr. Carless, who was a Territorial officer, was mobilised with his unit, and Mr. Hiles carried on and continued the practice after Mr. Carless died, and was joined ultimately in partnership by his son, Mr. H. J. Hiles.

Worcester News says of him: "Mr. H. B. Hiles' good humoured personality won him many friends in the country. He had a keen love of country sport, and was year by year associated with point-to-point meetings as hon. veterinary surgeon. He was popular among farmers, who esteemed him not only because of his skill and knowledge as a veterinary surgeon, but because they appreciated his bluff and genial character. These pleasant characteristics won him many friends in social and sporting circles, and he will be missed by a good many people who liked his happy and breezy manner."

He was a Freemason and in sport was a keen player, when opportunity offered, of bowls.

Mr. Hiles was 61 years of age. He married in 1907 Miss Marian Carless, a daughter of Mr. W. S. Carless, his early partner, and she and one son, Mr. H. J. Hiles, and a daughter, Mrs. A. M. Denny, survive him.

The late Mr. T. F. Prime, M.R.C.V.S.

Mr. Thomas Fletcher Prime, of Upper Norwood, whose death it was our sad duty to record last week, was the elder son of the late Mr. Thomas Robert Prime, who began to practise as a veterinary surgeon in Upper Norwood in 1876. Mr. T. F. Prime and his brother, Mr. W. H. Prime, both studied at the Royal Veterinary College, and as they qualified they joined their father in the business. After Mr. T. R. Prime's death in 1918, which was followed a year later by that of his wife, the two sons carried on the business.

"The family is a very old Norfolk one," states *The Crystal Palace Advertiser* in a tribute, which continues: "Mr. T. F. Prime had seen a good deal of the world. He was a civil transport veterinary surgeon at one time and among long voyages he made on cattle and other animal boats were from New Orleans to the Cape and from Fiume to the Cape. In the last war he kept data which was of value to the Government in regard to the feeding of pigs on swill at the firm's infirmary at Westow Street. In the present war he did much appreciated work as N.A.R.P.A.C. Regional Officer for South London. He arranged for shelters in all parts of the district for animals that might be caught in the streets in air raids. Apart from his work as a veterinary surgeon, Mr. Prime was interested in poultry, rabbits and other livestock. He was an original member of the old Norwood Fanciers' Association and frequently exhibited at shows. He was also a keen philatelist."

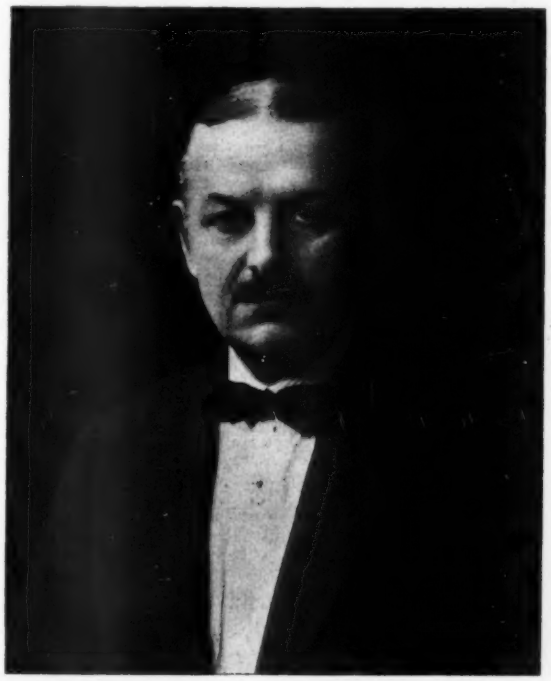
Mr. Prime suffered severe blows some few years ago in the death of his only son, which was followed within a week by the passing of his wife. Then in the blitz of March last, when a bomb fell near the back of his house, 21, Westow Hill, he sustained shock. He was in a nursing home for some six weeks, and was then able to get about again, but his friends noticed that he had not made the full recovery hoped for.

The late Mr. Trevor Spencer, M.R.C.V.S.

The many friends and associates of the late Mr. Trevor Spencer, will have learned with profound regret, though probably not entirely with surprise, of his death which, as recorded in last week's issue of *The Veterinary Record*, occurred on Wednesday, January 21st.

For some time he had felt the symptoms of a failing heart, and on Christmas Day, took to his bed for the last time. He was 71 years of age, years which had been full to overflowing, of prowess and achievement.

In our profession he was widely known, not only in England but abroad, and his views and knowledge always commanded respect. He graduated at the London College in 1890 and for nearly 50 years conducted a large lucrative practice at Kettering.



Among the many public appointments he held were those of Inspector to Kettering and District Dairies Committee, Veterinary Inspector to Northamptonshire County Council, Veterinary Lecturer to the County Institute of Agriculture, Moulton, and L.V.I. to the Ministry of Agriculture.

In an honorary capacity Mr. Spencer was veterinary surgeon to several agricultural societies and hunts, and was a founder of Kettering and District Shire Horse Society. He was a great horseman, hunting being one of his fondest sports, and no mean exponent in the use of rod and gun; whilst as a judge of horses his opinions were much sought and respected. He took a keen interest in country practice and had a deep knowledge of bovine obstetrics. Indeed he was one of the pioneers in the evolution and use of the wire saw in embryotomy.

Mr. Spencer served for twelve years as a member of Council R.C.V.S., was a President of the Midland Counties' Division, a prominent member of the N.V.M.A. and of the Central Veterinary Society. His contributions to veterinary literature were too numerous to mention.

It is tragic to have to realise that such a long and useful life dedicated so fully to his profession and to the betterment of the animal kingdom, should at last have to terminate, thus creating a void which can never be quite filled. Trevor Spencer was an upright, honest and kindly man, a staunch friend and an ornament to his profession.

How curious it is that only after death does the world generally indulge in eulogistic appreciation of figures which could and should have received kindly reference, praise and encouragement during their lifetime. How true it is that one never misses the water until the well has gone dry, or that the excellence of the music of many a composer is discovered only after the author's death! So is it equally true that the worth, energy, achievements and value to the community of countless hard-working, simple-living individuals are too often unappreciated until too late.

The veterinary profession has suffered a grievous loss, and our members extend their heartfelt sympathy to the widow and daughters in this their hour of deep grief.

H. K.

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PERSONAL TRIBUTES

The contributor of the above notice also writes:

The news of the loss of Mr. Trevor Spencer will doubtless prove as profound a shock to many readers as it did to me. For many years I counted myself fortunate to be regarded as one of his personal friends, and it comes hard to lose a good friend. The official account of his life and achievements is published above; thus rather than duplicate facts which may already be widely known, I will content myself with paying a heartfelt personal tribute.

Trevor was a man of independent thought and was fearless in giving it expression. When he took up a cause which he deemed a right and just one, nothing could swerve him from pursuing it to the end. He had a real love of animals, and I shall always remember his well meant (though perhaps rash) attempt to stop an act of cruelty in a crowded street of Tangier, some years ago. He and I stood watching the natives going about their routine jobs—many of them driving a mule, weak, fragile, underfed, and always grossly overloaded—until one mule approached, laden with baulks of timber. The animal was very lame, and was unwilling to move fast. The owner walked behind prodding the anus with a pointed stick. This cruelty so incensed Trevor that he bawled at the native to stop it, at the same time dashing across the road with an upraised stick. He was fortunately warned, in time, that the man would not have hesitated to draw a knife and use it, had he actually been attacked.

I admired Trevor for his fearless championing of the oppressed and wretched animals. He had a keen sense of humour and was always a courteous, charming companion.

My deepest sympathy is with his wife, Nancie, and her two daughters, who loved him dearly. Many members of Council, R.C.V.S., will remember the valuable assistance he gave that body over a number of years. These, and the whole profession, have now suffered an irretrievable loss. There are too few Trevor Spencers.

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W. K. T. writes:

"It has been my privilege to have had the friendship of Trevor Spencer for many years, and so I know in what high esteem and affection he had been held by all who were so fortunate as to know him. He served his profession, which he loved, with distinction, untiring energy and ability, but was forced during the past few years to go into semi-retirement, owing to ill-health, the greater part of his practice being carried on by his partner.

Trevor Spencer was a great and generous personality, always ready to help those less fortunate and those members of the profession who frequently sought his advice and assistance. He was a very fair and generous opponent. Many will remember him on the Council of the Royal College of Veterinary Surgeons, on which he served for 12 years, only retiring on account of failing health. There his genial presence and personality, and his unique and unrivalled experience added lustre to the Council.

Fond of all kinds of sport, he was a keen rider to hounds; always well mounted, he was a hard man to follow, being an exceptionally good horseman. His hobbies or pastimes were hunting, shooting, coaching and fishing: I think his greatest hobby was spending a fishing holiday with Paddy Howard in Ireland. At one time Trevor Spencer farmed successfully, but gave this up some years since.

He took no part in the public life of the town, but was always ready to participate in any charitable movements for the benefit of the district in which he lived.

By his passing we have lost an eminent member of the profession and one who had won the good will and appreciation of all who knew him. On behalf of my friends may I express our deep sorrow and our deep sympathy with the widow and two daughters in their bereavement. Typical of him was the fact that Trevor never went for a day's hunting without being accompanied by wife or daughter, and I think it not unfitting that reproduction should be made of the following extract from his will, for it shows the man he was: "I wish to place on record my deepest appreciation of all the loving care and thought which have been so generously bestowed upon me by my dear wife and children from each and all of whom I have derived the greatest happiness of my life and that God may bless and keep them is my dearest hope and wish."

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The Funeral

The funeral service took place on January 24th at Kettering Parish Church, in the presence of many old friends and numerous representatives of national and local organisations with which Mr. Trevor Spencer had been associated. Cremation followed at Kettering Crematorium.

The Rector of Kettering (the Rev. G. Holborow) conducted the services both at the church and at the crematorium. At the church service the Vicar of Cransley (the Rev. Greville Cooke, M.A., MUS. BAC.) was at the organ, and as the *cortège* entered the church, played "Coronach," a Highland lament, in accordance with the expressed wish of Mr. Spencer.

Members of the veterinary profession present were: Capt. W. K. Townson (Peterborough), representing the Council of the Royal College of Veterinary Surgeons, of which body Mr. Spencer was for many years a member, (with Mrs. Townson); Major J. J. Dunlop, M.C., M.R.C.V.S. (Northampton), representing the President and Members of the National Veterinary Medical Association; Mr. D. D. Canning, representing the Ministry of Agriculture; Mr. J. L. O. Connell (London); Mr. W. S. King (London); Mr. E. W. Hudson (Kettering) (with Mrs. Hudson), and Capt. P. R. Thompson (Oundle). The large attendance also included Lord Brooke of Oakley, Capt. G. F. Lucas, J.P., representing the Woodland Pytchley Hunt; Councillors H. Hodge, C.C., H. T. Tebbey and R. J. Gibbs, representing Kettering Town Council, with Mr. John Chaston (Town Clerk), while many agricultural and political bodies also paid tribute to Mr. Spencer's memory by the presence of their representatives and floral tributes.

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LEGAL NOTES

Sawdust Sold as Food for Poultry.—Food sold for poultry was described as 100 per cent. pinewood sawdust by Mr. Eric Voelcker, public analyst, at Slough, when Arnold Beaupre Eiloart, of Tiverton Mansions, Gray's Inn Road, London, and Peter Elstob, a serving soldier, were each sentenced to two months' imprisonment with hard labour for selling poultry food incorrectly described.

An inspector of food said that the men traded as Middleton's Vegetable By-Products Company and sold a "double stock poultry food" mixture which they claimed contained glucose and solved the poultryman's feeding problems.

Notice of appeal was entered and the men were released on bail of £50 each.

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The Ministry of Agriculture is to resume the award of grants for premium boars in England and Wales.

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In his annual report, Mr. F. Marshall, Secretary of Durham County N.F.U., states that it might well be asked why it was necessary to kill off so much home livestock if it was now necessary to obtain Irish cattle. The large-scale slaughter of home livestock and the ploughing up of rich pasture had been viewed with concern by many.